Pens, Tablets, Handhelds: Choosing the Best Information Tools

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ABSTRACT

An increasing number of pen-based computer options are becoming available to health care providers. Decisions about which device to use depend on cost, device capabilities, and the practicality of integrating the device with clinical activities. This panel will discuss successes, problems, and failures related to pen-based computer hardware, communications, software, and policies. The panel will offer thoughts about what our current understanding suggests for future devices and applications.

Dr. Geerlofs will discuss the experiences of Allscripts Healthcare Solutions with deployment of modular TouchWorks applications for prescribing, capturing charges, dictating, ordering and viewing labs, providing patient education, and taking notes.

C. Peter Waegemann will present the perspective of the Mobile Healthcare Alliance (MoHCA), the only not-for-profit organization for mobile health applications. He will analyze success and failures for applications with mobile healthcare computing devices (MHCDs – ranging from smart phones to PDAs to tablets) and address current hurdles of wireless point-of-care computing with a special focus on HIPAA compliance, security, and electromagnetic compatibility.

Dr. Rothschild will offer the perspective of a clinical user on currently available PDA applications, from drug reference guides and point of care decision-making software to clinical research instruments such as survey tools.

Paul Fontelo will discuss his experience in developing the PDA as a tool to access PubMed and clinical trials, as a wireless (802.11b, infrared, bluetooth) portal to a healthcare organization, as a teaching tool for medical student small group discussions, and physician and patient-oriented resources. He will report on a year-long experience in running and evaluating access to a web server developed purposely for pen-based computers.

OVERVIEW

Only ten years ago, pens contained ink, tablets delivered medicine, and a hand held was a compassionate gesture. Now, pen gestures on handhelds and tablets record medicine orders in digital ink. A dizzying array of handheld and tablet computer options suggest that the pace of change will remain brisk. The task of staying abreast of these technologies is daunting. The cost of staying at the cutting edge of these technologies is large. The cost of falling behind might be intolerable, or it might be meaningless.

Pen-based computers (PBCs) were available in two sizes at the end of 2002 - the Personal Digital Assistant (PDA), and the tablet computer. Most PDAs were either computationally challenged or energy drains, but they usually fit in a shirt pocket. Tablets were thin laptop computers without keyboards. Wireless connections to Local Area Networks and the Internet were available for both PDAs and tablets. Two major operating systems - Palm OS and Pocket PC - were the major competitors in the handheld market, with a few noteworthy alternatives, such as Blackberry, available in the combination PDA and mobile communication market. Microsoft operating systems dominated the tablet market.

Predictably, the range of PBC shapes, sizes, and configurations will increase. Memory, computing power, battery life, and connectivity will steadily improve. Human interface options may grow to include expandable displays, virtual displays, display on any convenient screen, gesture or voice input, and so on. We should face myriad options in the near future.

The potential applications for currently available hardware are diverse. A patient might document his interval medical history on a PBC, perhaps while at home. A patient might receive a PBC to guide and inform her through a complex multidisciplinary clinical evaluation, or to create a diary of her

treatment experience at home. Students might use PBCs to learn medical content in pre-clinical classroom settings. In clinical settings, students might use PBCs for medical reference, to track patients, to record their experiences for course directors, to receive patient-centered instruction, and to complete written coursework. Nurses using a PBC might enter patient care observations directly into electronic medical records. Physicians may use PBCs for reference, decision support, CPOE, note-writing, and retrieving reports, images, laboratory, and relevant epidemiological data. Any provider might use PBCs for patient education. Quality assurance teams might collect observations about health care environments. PBCs anchored to kiosks might replace suggestion boxes as a means of collecting feedback from patients and employees. Many of these applications are already implemented.

These uses of PBCs will have different human interface, security, portability, and connectivity requirements, at the very least. Some tasks may require just the right PBC, and fail with any other. For instance, animated patient education probably works best on the large, brightly lit screens currently available on tablet computers. In contrast, nurses probably cannot carry a tablet computer on one arm while attending to patients' other needs. Security (e.g. HIPAA compliance) and connectivity require much more effort for the nurses' device.

In many situations we need to learn more about the trade-offs. Would a powerful, high capacity tablet computer help students learn more from clinical activities than they would learn with a wirelessly connected handheld? What about a standalone handheld? Are the differences worth the cost? Some doctors from low-resource settings hope to use PBCs, especially PDAs, as an alternative to desktop computers. What are the risks and trade-offs? If your records are on paper and you can find drug interactions, search PubMed, and print instructions from a PDA, what does a desktop add?

Which devices and configurations work best for which tasks? Why? Can we predict what features are required for a specified set of tasks? What other uses of pen computers can we anticipate? What will the benefits be? What will it cost? How important are open standards and competition between operating systems and hardware platforms in containing cost? What can we do to guide the development of pen computers along paths that are cost-beneficial to patients? Realizing that the answers will be accumulating for years to come, the panel will venture to share their current thoughts about lessons learned from available technologies.